

## EXHIBIT F

IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF VIRGINIA  
Norfolk Division

R.M.S. TITANIC, INC.,  
successor-in-interest to  
Titanic Ventures, limited partnership,  
Plaintiff,

v.

Civil Action No. 2:93cv902

THE WRECKED AND ABANDONED VESSEL, et al.,  
Defendant.

**DECLARATION OF WILLIAM LANGE**

I, William Lange, declare under penalty of perjury, as follows:

1. I served as an employee of Woods Hole Oceanographic Institution (WHOI) for over 38 years, until I was forced into early retirement last year, sparked because of my collaboration with R.M.S. Titanic, Inc. (“RMST”). I now serve as a paid consultant to RMST.

2. For the last 30 some years as an employee of WHOI, I created and served as the Director of the Advanced Imaging and Visualization Laboratory, where I pioneered the development of new imaging technologies and survey methods for the exploration of the world’s oceans.

3. I have participated in ten or more expeditions to *Titanic* and have worked on dozens of documentary films about *Titanic*, bringing cinematographic quality imaging to the undersea and scientific worlds. I have pursued completing the mapping effort, which was begun using the 1985-1986 data sets, which upon analysis had many un-surveyed areas and gaps. To complete my goal to accurately document and map the Titanic site I partnered and worked with many media groups over three decades with the hope that I would obtain imagery to fill the large gaps in the WHOI 1985 & 1986 Datasets.

4. I was on the 1985 discovery expedition to *Titanic*, and I was one of the first people to locate and then visualize the wreck site.

5. While at WHOI, and in partnership with RMST, I directed the remote optical and sonar survey of the RMST Expedition 2010 and am responsible for creating products such as sonar and optical maps of the Titanic Site. The raw data from these surveys were used to create the first detailed mapping of the site using both sonar and optical imaging. Data products and derivative IP included the creation of sonar and optical mosaics, bathometric models, close up visual inspection, 3D videos, 3D Photogrammetric Models, 3D cinematography, 2D Cinematography. We used a variety of tools including GIS, Photoshop and Mission Analysis software from the US Navy to assist in the interpretation of sonar and optical imagery, and used these analysis tools to create 2D and later 3D Mosaics of the site. Our team created the largest and highest resolution color images of the Titanic Bow, Stern, and features and objects in the debris field ever created. These mosaics included down-looking and profile views of features of interest at the site. The methods and workflows allowed us to assess and document the spatial distribution of all features and objects of interest. At this stage we began the process of completing a time series study of the site by adding other available data sets to the RMST Research Team GIS system.

6. I testified as an expert before this Honorable Court in 2012.

7. I have carefully examined the document entitled “Research Design: *Titanic* Site Mapping, Limited Photogrammetry and Comparative Temporal Analysis of Site Changes, 1985-20” attached filed with the Court as ECF Doc. 636-2 (the “SEARCH Plan”).

8. Based on my knowledge and first-hand experience, I believe that SEARCH Team has used intellectual property developed by my team while at WHOI, and owned by RMST

pursuant to contractual documents we were all required to sign, in the development of its plan. I worked with Dr. Delgado on RMST Expedition 2010 and delivered this intellectual property to him when he worked for NOAA.

9. The mission goals and objectives in the SEARCH Plan are identical to plans developed by the RMST team for the RMST Expedition 2010, all of which were known by Dr. Delgado and his colleagues at NOAA. The RMST intellectual property was also used for RMST's planning of the next scientific and targeted artifact recovery expedition now deferred to 2021.

10. Most of the mission goals and objectives in the SEARCH Plan proposed by SEARCH Inc. have already been successfully accomplished by RMST using the RMST Expedition 2010 data and IP and therefore are redundant, duplicative and scientifically unnecessary.

11. I believe the SEARCH Plan as planned is impossible to complete with a time on site of only 96 hours. The stated goals do not match the time available on station, and I question whether SEARCH seeks to truly conduct a scientific expedition or merely seeks to create a live television and telepresence event under the cover of performing the scientific tasks and goals.

12. The SEARCH Plan requires long-term study and the utilization of other data sets, yet there is no mention as to how and who will be taking on this activity or how it is to be funded.

13. SEARCH failed to disclose its expedition plans to RMST and to me, when collaboration with RMST would have led to a meaningful and better set of scientific goals.

14. The SEARCH Plan claims that it seeks to document the distribution of the material remains at the site through sonar mapping. This work was successfully completed and

published by RMST after the RMST Expedition 2010. This work is not essential to the further study and or management of the *Titanic*. More dedicated time on station would be required than planned by SEARCH to repeat what the RMST Expedition 2010 previously already accomplished.

15. The SEARCH Plan claims that it seeks to produce Limited photogrammetric documentation of areas of the wreck site for comparison with data from 1985, 1986, 2001, 2003, 2004 and 2005. This goal represents a continuation of the time series comparison study initiated by RMST and AIVL-WHOI in 2010. After the RMST Expedition 2010, RMST funded a post processing effort and along with funding from the Mellon Foundation and other sponsors for the time series study of the Titanic Site. This study effort is still active at RMST. Although NOAA was originally committed to supporting this time series work, no funding or in kind support materialized from NOAA to support this effort. This research effort did successfully merge data rescued and digitally migrate 35mm film images from the 1985 and 1986 WHOI Expeditions, along with Russian MIR data into the RMST Research Graphical Information System Database. This study design now allows easy comparison of data from a variety of expeditions to the site. Additionally, another RMST GIS Database contains geo-rectified data on each object recovered from the site, thus facilitating the RMST and AIVL-WHOI goal of creating a database describing the site as best as possible prior to discovery and disturbance. This RMST Research Graphical Information System Database was a goal that WHOI Director Susan Avery supported and approved of.

16. The SEARCH Plan's use of the term "limited photogrammetric documentation" may be misstated or misleading. RMST has been the only group to date to successfully acquire

3D photogrammetric data from the RMS Titanic Site and to create highly accurate 3D Volumetric Models. *See* RMST AIVL MITech Press Release attached hereto as Exhibit 1.

17. The SEARCH Plan claims that it seeks to assess the structural and environmental changes at the site since its discovery in 1985 through comparative assessment of data from previous missions. This objective represents a continuation of work commenced by RMST in RMST Expedition 2010.

18. The SEARCH Plan claims that it seeks to make observations on in-situ preservation and assess potential future changes to the wreck site based on environmental conditions present around the ship. This objective represents a continuation of work commenced by RMST in RMST Expedition 2010.

19. The SEARCH Plan claims that it seeks to use the data from this mission to propose a long-term preservation plan for the site, including monitoring, and environmental analysis. For the archaeological and historic preservation community, significant sites should have a comprehensive program of stewardship guided by archaeological and historic preservation standards and ethics. This goal requires quantitative data from many expeditions in order to best study and determine what is best for the *Titanic* in-situ preservation. No accurate scientific or archeological finding or recommendation can be made without a clear understanding of the environmental and structural conditions in the interior of the main hull sections. This goal also mimics the mission plan RMST submitted to NOAA at NOAA's request to better understand what scientific objectives should be made following the RMST Expedition 2010.

20. The SEARCH Plan claims that it seeks to document the relative position, orientation, and spatial organization of every component, from the major hull sections to individual artifacts. These goals are equally part of RMST's continued work on expedition data

from the site and were completed following the RMST Expedition 2010. RMST completed and compiled the position, orientation of the hull sections, features and objects at the *Titanic* Wreck Site. Dave Conlin, another Advisor to SEARCH, and I created a series of spatial distribution analysis and produced notes, diagrams, and maps showing in detail the spatial orientation of hull sections, features, and objects in artifacts and debris fields. The spatial analysis, image interpretation work has been accomplished using the RMST 2010 IP. Another spatial analysis effort is redundant and not required for continuing the analysis of data from the site. The RMST team conducted an error analysis of the survey data and has applied these findings to the orientation of features and objects in a merged optical and acoustic mosaic of the stern and debris and artifact fields near the stern section. I formally presented a portion of this work to Messrs. Delgado and Conlin while at WHOI and in a RMST approved series of public lectures that they participated in. The goal of merging multiple legacy expedition data sets by the RMST Team was done to support time series studies and the goal of creating a digital view of the *Titanic* Wreck Site prior to its discovery in 1985. Further work announced in 2019 included the publishing of a new detailed report on the *Titanic* Wreck Site and detailed and rigorous photo interpretation and identification of objects from of all available *Titanic* Data Sets. In this regard, the SEARCH Plan mentions that it already has certain data sets in its possession, which may include work done at AIVL funded by MRST and/or Mellon Foundation.

21. The SEARCH Plan claims that it seeks to virtually reattach or replace hull sections and other components of the vessel. Again, this proposed work is another continuation of work completed or underway at RMST. This goal and others require the completion of a high-resolution optical and acoustic coordinated mapping of the site which, excluding live television or telepresence events, would likely require a minimum 21 days on site and with

favorable conditions at the surface and on the seafloor for optical imaging purposes. It is currently hurricane season at the Titanic Wreck Site.

22. The SEARCH Plan claims that it seeks to understand longitudinal changes at the site, comparing previously recorded images to help quantify structural changes over time. RMST has created maps and mosaics of the site and has been working on time series analysis and image interpretation. RMST has collected the first 3D Volumetric Photogrammetric data set at the Titanic Site. RMST has also produced two 3D photogrammetric models to date using both 2010 data and developing means to merge non-photogrammetric data with photogrammetric data. 3D image interpretation allows data specialist to easier understand size and spatial orientation of objects. This proposed work appears to be a direct continuation of ongoing RMST work.

23. This technical approach given an extended time on station could acquire sonar images similar or slightly better in quality to the sonar data collected during the RMST Expedition 2010. However, in 2010 we determined the point in which we wanted to switch to optical imaging, which had higher resolution and fewer errors for mosaicking.

24. In 2019 the government of South Korea commissioned me to study and report on certain technical capabilities of Ocean Infinity, specifically a review of the work completed by Ocean Infinity during the survey of the vessel Stellar Daisy. Based on my review of the data collected at the Stellar Daisy site, I do not believe Ocean Infinity has the technical expertise to accomplish many of the goals to the degree of RMST 2010 data quality as set forth in the SEARCH Plan.

25. The SEARCH Plan claims that it seeks to conduct optical imaging of the wreck site at a distance of 10 meters away. The 10-meter stand-off range from the hull, features,



objects and the seafloor is not compatible with detailed close-up inspection imaging of the site and will likely not produce data quality to the degree mentioned as required to complete the SEARCH Plan, and based on my knowledge and experience, will likely require more than 4 days on site to complete and is yet another continuation of RMST's work at the site.

26. The LIDAR laser scanning method contained in the SEARCH Plan has been developed and mutually tested by National Park Service, Marine Imaging Technologies, and will likely require more time on station than what is available. This survey method was included in the Mission and Technical Plan I submitted to NOAA in 2018. I was informed by 3d@depth, an underwater LIDAR company, it would take 21 days to complete the survey of the site and would require pylons placed at the site for calibration purposes.

27. The SEARCH Plan claims that it provides an opportunity for live broadcast, which I believe is the true purpose of the expedition, to detract from RMST's plans surrounding the "Marconi" expedition, which were originally scheduled to occur in August and September 2020.

28. In summary: the SEARCH Plan appears to be a continuance of work commissioned and owned by RMST; it seems to draw heavily upon items privately discussed with NOAA RMST and AIVL-WHOI; most of it is duplicative of work completed by RMST in Expedition 2010; and it is not currently scientifically necessary.

29. RMST and the Mellon Foundation funded work at AIVL WHOI that initiated AIVL-WHOI to begin time series studies of the site. This effort including importing other legacy data such 1985, 1986, 2005 and MIR data into the RMST 2010 RMST Research Graphical Information System Database.

30. RMST conducted a 3D photogrammetric survey of the site in 2010 and published a 3D volumetric photogrammetric model in 2019.

I declare under penalty of perjury pursuant to 28 U.S.C. Section 1746 that to the best of my knowledge and belief, the foregoing is true and correct. Executed on July 7, 2020.

A handwritten signature in black ink, appearing to read "William N. Lange", with a long horizontal flourish extending to the right.

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William N. Lange  
Director of Imaging and Visualization  
Experiential Media Group

## EXHIBIT 1

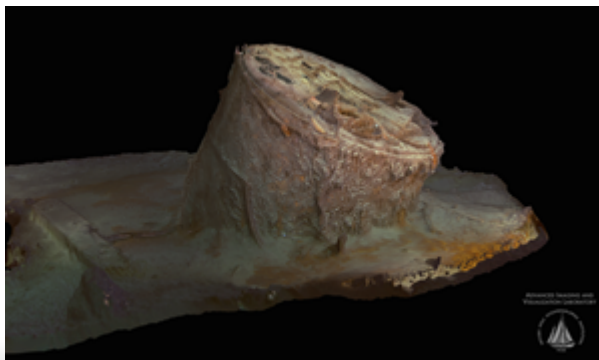
# 107 Years After Titanic's Maiden Voyage, Researchers Work to Preserve the Ship's Legacy

RMS Titanic, Inc., Marine Imaging Technologies, Advanced Imaging and Visualization Lab of the Woods Hole Oceanographic Institution collaborate to bring the most advanced scientific research to Titanic's wreck site

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April 15, 2019 15:57 ET | Source: RMS Titanic, Inc.

Example of 3D volumetric optical photogrammetric model of RMS Titanic boiler.



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ATLANTA, April 15, 2019 (GLOBE NEWSWIRE) – On April 15, 1912, the RMS *Titanic*, the world's largest ship, sank after colliding with an iceberg off the coast of the North Atlantic. Now 107 years later, RMS Titanic, Inc., an affiliate of Experiential Media Group, and the Salvor-In-Possession of RMS *Titanic* and its wreck site, will continue its commitment to preserving the legacy of the Ship and the memories of those on board.

A new partnership, between Marine Imaging Technologies (Marine Imaging), Advanced Imaging and Visualization Lab (AIVL) of the Woods Hole Oceanographic Institution (WHOI), and RMS Titanic, Inc. (RMST) will bring the most advanced scientific research and site management plan to the RMS *Titanic* wreck site.

This partnership establishes the RMS Titanic Survey Data Scientific Study Center, where advanced and newly refined research methodologies including underwater 3D imaging will lead to the clearest and most comprehensive data collected to date. In addition, the group will work with maritime heritage archeologists to draft management strategies for preserving the wreck site and deliver new ways of viewing RMS *Titanic* through documentary and museum films, virtual reality (VR), simulator rides, and museum exhibitions.

“No one entity has done more to continue to preserve the legacy of RMS *Titanic* than RMS Titanic, Inc.,” said Dr. David Gallo, Director of Special Projects at Experiential Media Group. “This scientific collaboration not only signifies the next chapter in RMS *Titanic*’s story but continues our renewed commitment to provide the most technologically advanced and comprehensive research of the wreck site. Years of thorough study, dedication and thoughtful collaborations have allowed us to make clear and careful steps towards protecting RMS *Titanic* for future generations.”

To date, AIVL at WHOI has compiled and processed survey data from RMS *Titanic* expeditions in 1985, 1986, 1991, 2005, and 2010. This unique, comprehensive data set will further the understanding of structural and environmental changes to the RMS *Titanic* site over various time periods since its sinking. In addition, this expedition survey data, when combined with RMST’s already impressive collection of imagery from multiple expeditions to the RMS *Titanic* site, will provide a deeper understanding of the site at the time of discovery and add to the forensic time series of study.

In order to facilitate analysis and study of the RMS *Titanic* site, AIVL and Marine Imaging have applied newly refined methods, including underwater 3D photogrammetric volumetric imaging, to the existing data sets. The 3D volumetric models they produced are derived from AIVL’s precision 3D survey systems that were conducted during prior expeditions to the site.

AIVL and Marine Imaging have also created the very first 2D and 3D motion videos of

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only improves our scientific view of the seafloor but allows us to easily share these views with the general public.”

“This new RMS *Titanic* leadership team offers a comprehensive approach to monitoring the Ship while engaging the global community in our efforts,” said Alexandra Klingelhofer, Vice President of Collections for Experiential Media Group. “Our objective is simple: to utilize the most up to date oceanographic and scientific data, for historical verification, scientific education and public awareness. This collaboration further solidifies these objectives while providing the most up to date records to protect the RMS *Titanic* wreck site. In addition, this data will help support a broader set of research initiatives related to the current state of deep-sea environments.”

### **Video File - Boiler B**

HD Version.

**<https://vimeo.com/330255618>**

4K Version. PW Boiler2019.

**<https://vimeo.com/330257297>**

HD and UHD TV Video created from an interactive 3D volumetric optical photogrammetric model created by AIVL-WHOI/Experiential Media Group. This interactive model was created from 2D and 3D optical imagery collected at the RMS *Titanic* wreck site in 2010. The video is an example of the type of underwater wide area 3D optical reconstructions can be created using these new techniques and methods. RMS *Titanic*’s “B” Boiler is approximately 7 meters or two stories tall.

### **Image 1**

Still frame image of Titanic’s “B” Boiler. This still image was extracted from an interactive 3D volumetric optical photogrammetric model created by AIVL-WHOI/Experiential Media Group. RMS *Titanic*’s “B” Boiler is approximately 7 meters or two stories tall.

Image 1 is available at

**<http://www.globenewswire.com/NewsRoom/AttachmentNg/ea3783ec-a7ce-4896-ad9e-cecea2656223>**

### **About Experiential Media Group/ RMS Titanic, Inc.**

RMS Titanic, Inc. (RMST) a subsidiary of Premier Acquisition Holdings LLC and an affiliate of Experiential Media Group, serves as the exclusive steward of RMS *Titanic* which tragically sank on April 15, 1912. The Company is dedicated to preserving the legacy of the Ship, wreck site and all her passengers and crew. Since 1987, RMST has

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## About Advanced Imaging and Visualization Laboratory Woods Hole Oceanographic Institution

The Advanced Imaging and Visualization Laboratory (AIVL) develops and operates innovative deep-sea imaging and telemetry systems for use in remotely operated vehicles, autonomous underwater vehicles, manned and unmanned aerial vehicles, diver-operated systems, as well as deep-diving human-occupied vehicles. AIVL's precision imaging systems have been used all around the world in everything from underwater scientific and archaeological surveys to high-altitude animal health assessments and the documentation of rocket launches. In addition to supporting the scientific community, the imagery collected has been used for educational exhibits in numerous museums, science centers and repurposed for various television and film programs.

## About Woods Hole Oceanographic Institution

The Woods Hole Oceanographic Institution (WHOI) is a private, non-profit organization on Cape Cod, Massachusetts, dedicated to marine research, engineering, and higher education. Its primary mission is to understand the ocean and its interaction with the Earth as a whole, and to communicate this understanding for the benefit of society. For more information, please visit [www.whoi.edu](http://www.whoi.edu).

## About Marine Imaging Technologies

Marine Imaging Technologies (Marine Imaging) designs and creates the technology necessary to capture mesmerizing and thought provoking imagery above and below the water. The company was founded by creative professionals and passionate engineers who share the desire to protect the oceans by reaching the core of what makes us human—telling stories and sharing emotions. The vision, imagination, and skills inherent in the team have led to pioneering technology used to inspire and help explain our underwater world. [marineimagingtech.com](http://marineimagingtech.com)

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**Marine Imaging Technologies, LLC**

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